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LC53

"Z METER" CAPACITOR — INDUCTOR ANALYZER

SCHEMATIC & PARTS LIST

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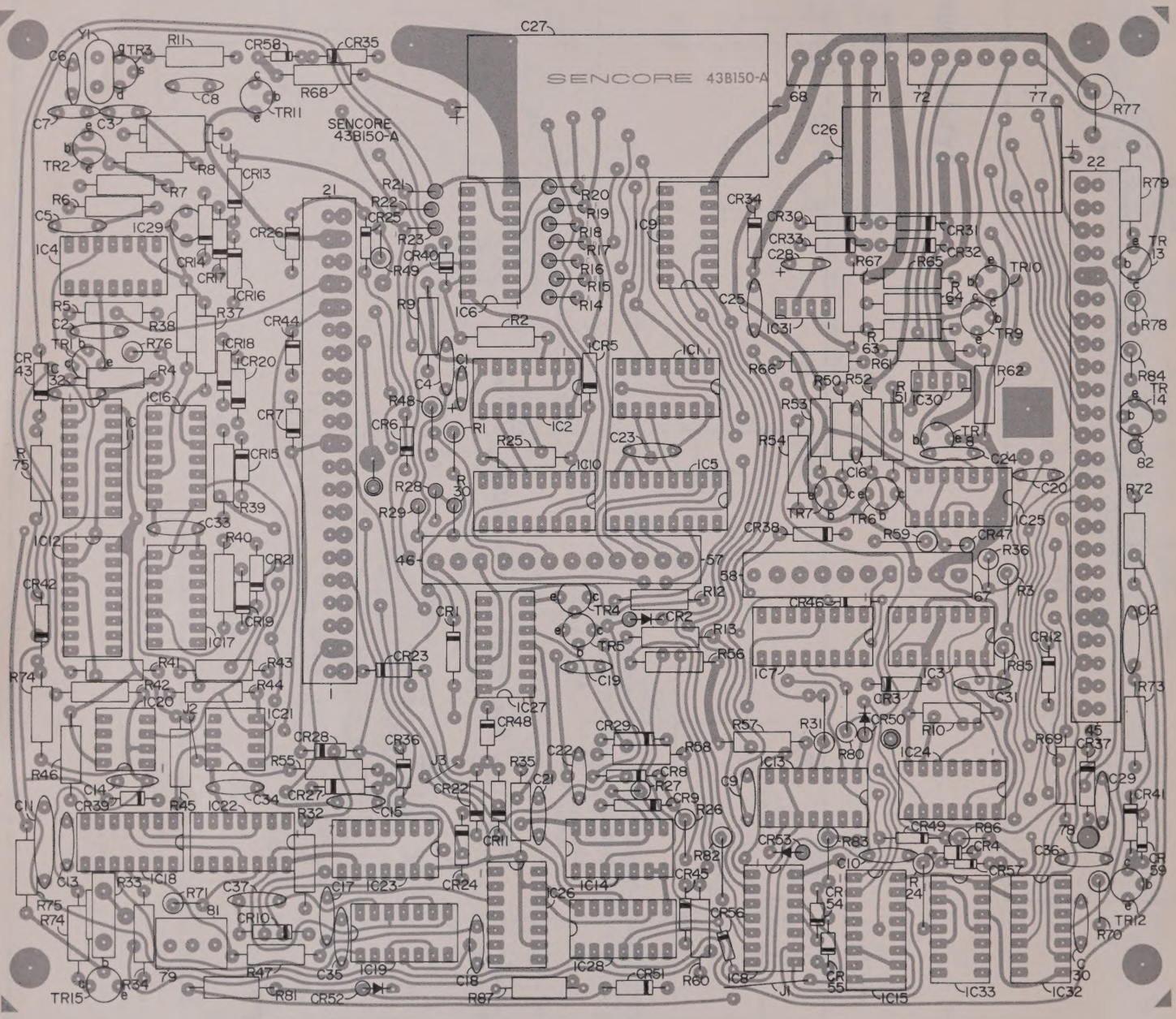
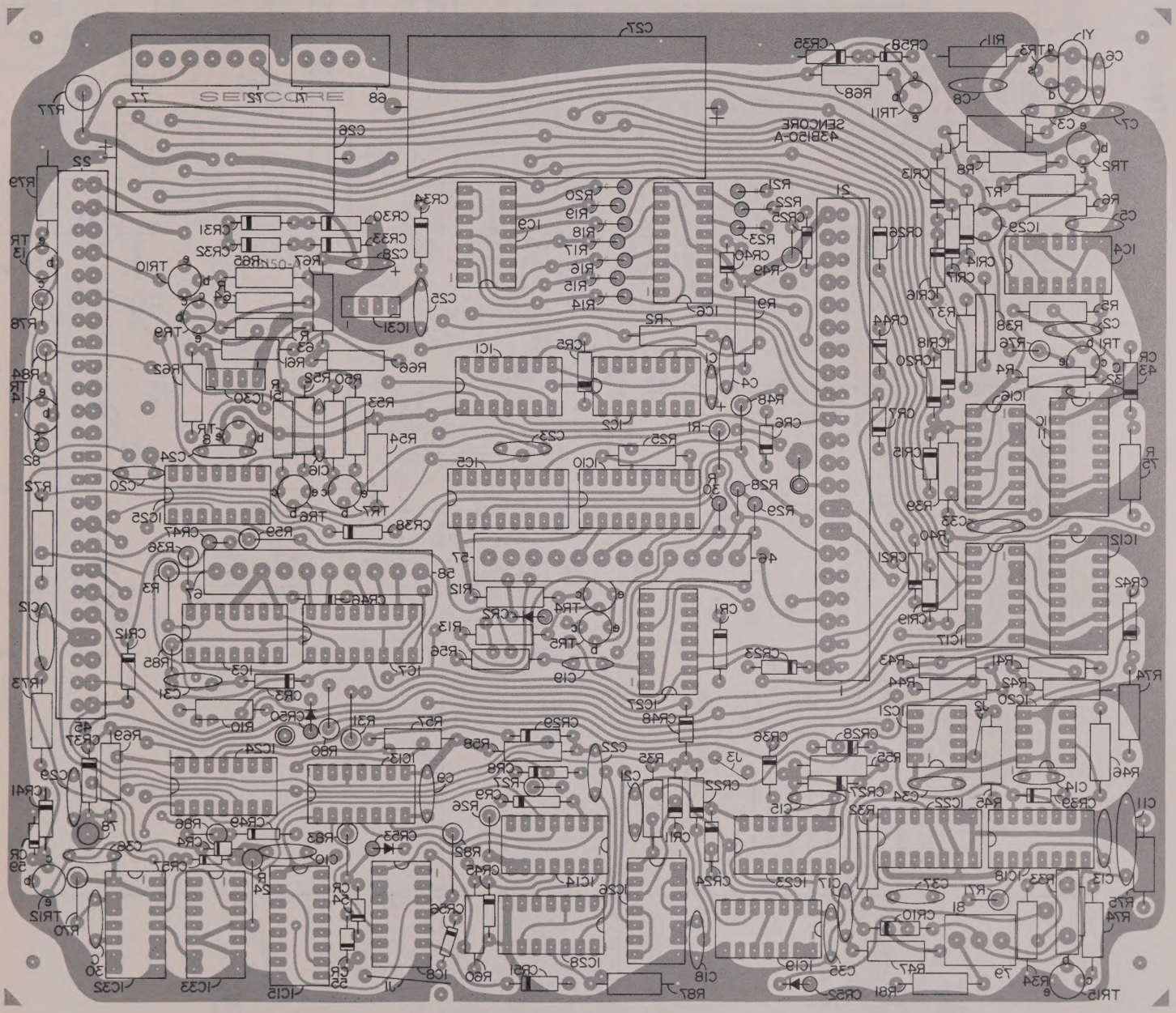
SHEET 1

This sheet includes schematics for the Analog and Display Boards. Layouts are found on Sheet 2.



DIGITAL BOARD (COMPONENT SIDE)

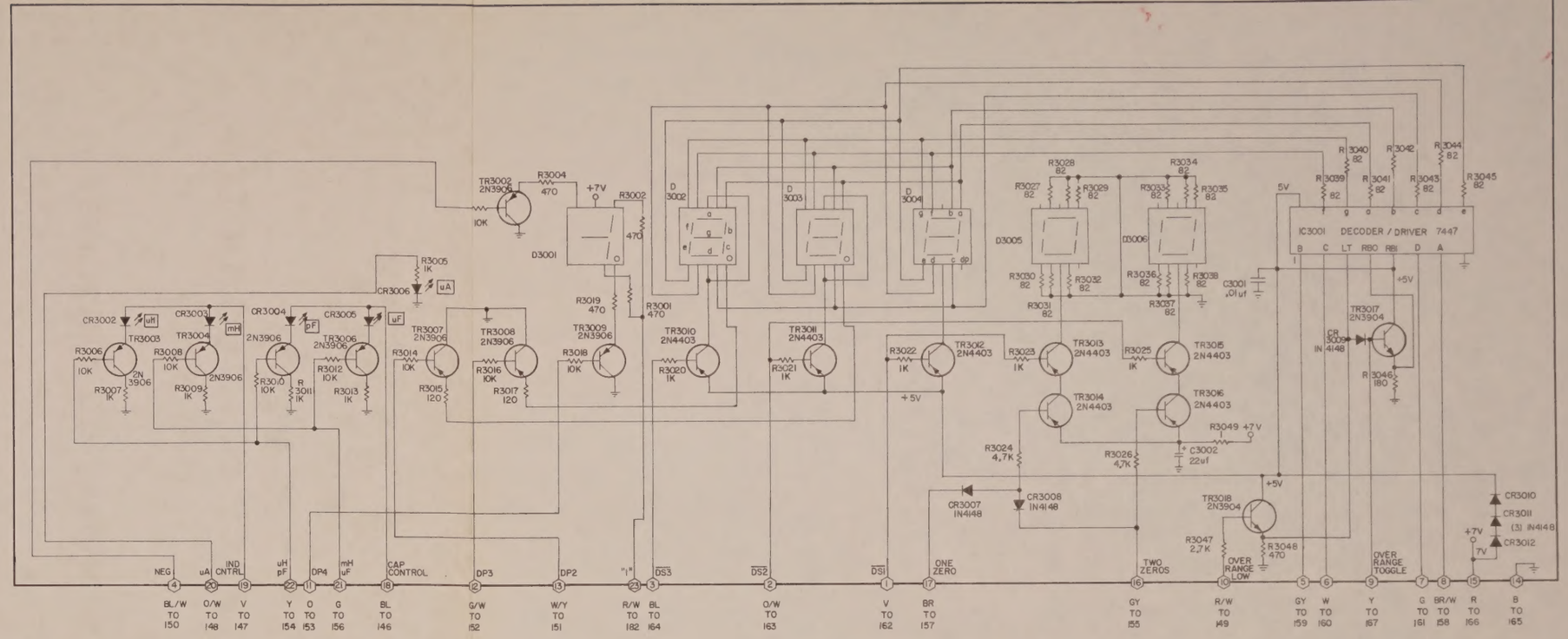


DIGITAL BOARD (FOIL SIDE)

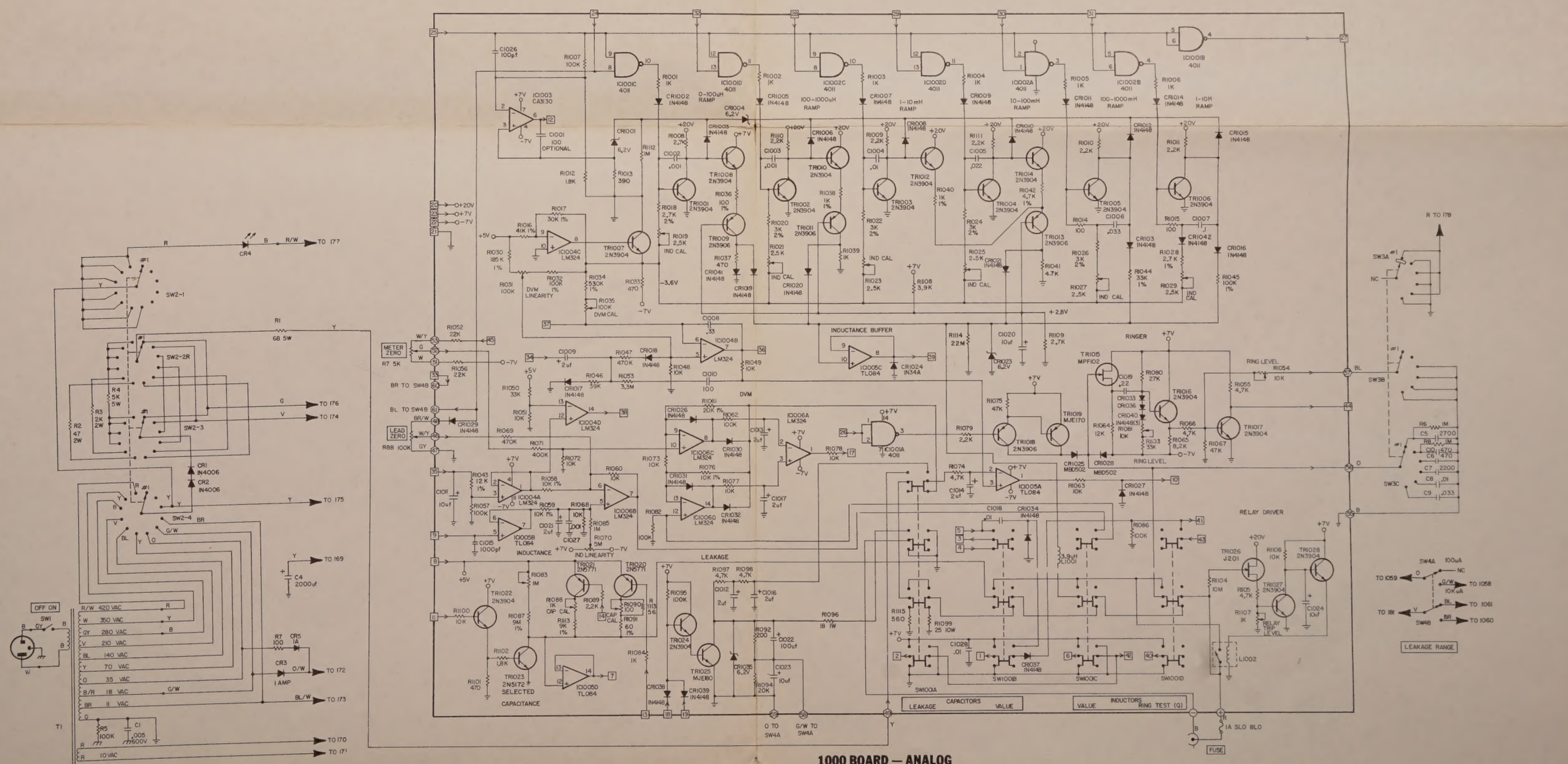
The schematic for the Digital Board is found on Sheet 2.

NOTES:

1. All resistances in Ohms.
2. All capacitances greater than one are pF, less than one are uF, unless otherwise indicated.
3. Board interconnection notes:
   a. All connections shown in a square □ are board-to-board direct connections. Connection numbers on both boards are the same. Example: [1] on analog board connects to [1] on digital board.
   b. All connections shown in a hex ⬡ are through cable connectors. The first digit of the "To" note indicates which board the opposite end of the cable is connected. The last part of the "To" note indicates the connector number on that board. The color of the connecting wire is also indicated. Example: "O/W TO 3020" indicates the orange/white wire connects to point 20 on the 3000 board.
   c. All connections shown in a circle ◯ are on the same board. No connector is used.
4. All controls, jacks, and displays on the exterior of the unit are shown in a box [ ].
5. All voltages shown are taken with all buttons in the "out" position. They are taken with a 15 Megohm meter connected to circuit ground.



3000 BOARD — DISPLAY



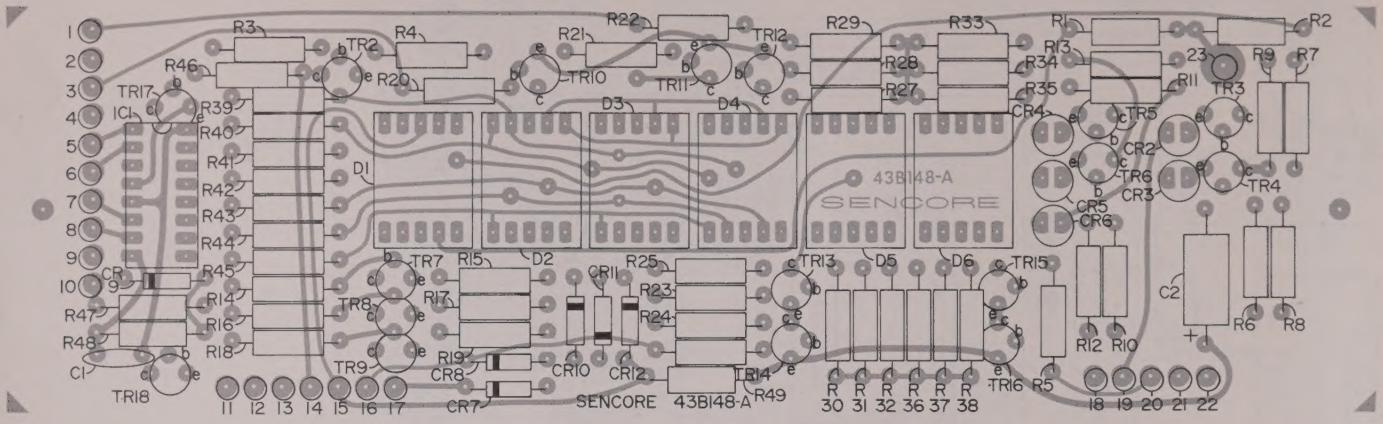
1000 BOARD — ANALOG

SCHEMATIC REFERENCE	PART NO.	DESCRIPTION
DIGITAL P.C. BOARD (100 Board)		
IC1, 13	69G7-B	IC, 4001 Quad 2 in NOR
IC2, 8, 19, 25, 26, 32	69G3-B	IC, 4011 Quad 2 in NAND
IC3, 14, 22, 23, 28, 33	69G8-B	IC, 4013 Dual D F.F.
IC4	69G42	IC, 74LS90 Decade Counter
IC5, 10	69G57-B	IC, 4042 Quad D Latch
IC6	69G45-B	IC, 4017 Decade Counter
IC7	69G23	IC, 14553 Three Decade
IC9	69G56-B	IC, 4002 Dual 4 in NOR
IC11, 12, 15	69G36	IC, 14518 2 Decade
IC16, 17, 27	69G11-B	IC, 4016 Quad Switch
IC18	69G7-A	IC, 4001 Quad 2 in NOR AE
IC19	69G3-A	IC, 4011 Quad 2 in NAND AE
IC20, 21	69G58	IC, LM311 Comparator
IC24	69G11-A	IC, 4016 Quad Switch AE
IC29	69G29	IC, LM78L05A 5V Reg.
IC30	69G73	IC, uA78 MGU1-C Positive V. Reg.
IC31	69G74	IC, uA79 MGU1-C Negative V. Reg.
TR1, 2, 4-7, 9, 10, 12, 13-15	19A33-1	Transistor, 2N3904 NPN
TR3	19A50	Transistor, J211 N Channel FET
TR8	19A29-1	Transistor, MJE180, NPN
TR11	19A44	Transistor, 2N4401 NPN
CR1-9, 11-29, 36-60	50C5-2	Diode, 1N4148
CR10	50C5-4 SEL 1 or 3	Diode, 1N456
CR30-34	16S10	Diode, 1A
CR35	50C4-8	Diode, 1N4747A 20V 5% Zener
R35	15C7-13	Control, 100K, Vert PC Mount Pot.
R41	14C29-3004A	Resistor, 30K ½W 1% 100 ppm/°C
R42	14C29-6674A	Resistor, 66.7K ½W 1% 100 ppm/°C
R43	14C29-9003A	Resistor, 9K ½W 1% 100/°C
R44	14C29-1003A	Resistor, 1K ½W 1% 100 ppm/°C
R61, 67	14C30-5003	Resistor, 5K ½W 2%
R62, 66	14C29-2203A	Resistor, 2.2K ½W 1% 100 ppm°/C
R74	14C29-5004A	Resistor, 50K ½W 1% 100/°C
C1	24G384	Capacitor, 2.2 uF Lytic
C2,3	24G70	Capacitor, 100 pF Disc
C4, 5, 13-18, 22-25, 31-36	24G207	Capacitor, .01 uF Disc
C6, 8	24G324	Capacitor, 12 pF, Disc NPO
C7	24G317	Capacitor, 36 pF Disc NPO
C9	24G168	Capacitor, .22 uF Mylar
C10	24G59	Capacitor, .05 uF Disc
C11	24G319	Capacitor, .0056 uF Mylar 20%
C12	24G23	Capacitor, .02 uF Disc.
C19	24G17	Capacitor, .001 uF Disc.
C20, 39	24G125	Capacitor, .005 uF, Disc
C21	24G25	Capacitor, 220 pF Disc
C26	24G272	Capacitor, 1000 uF Lytic
C27	24G307	Capacitor, 2000 uF Lytic
C28	24G382	Capacitor, 10 uF Lytic
C29	24G216	Capacitor, .1 uF Mylar 10%
C30	24G190	Capacitor, 180 pF Disc
C37	24G188	Capacitor, .001 uF Poly 5%
C38	24G208	Capacitor, 150 pF Disc
L1	46G9	Coil, 10 mH
Y1	47A20	Crystal, 10 MHz

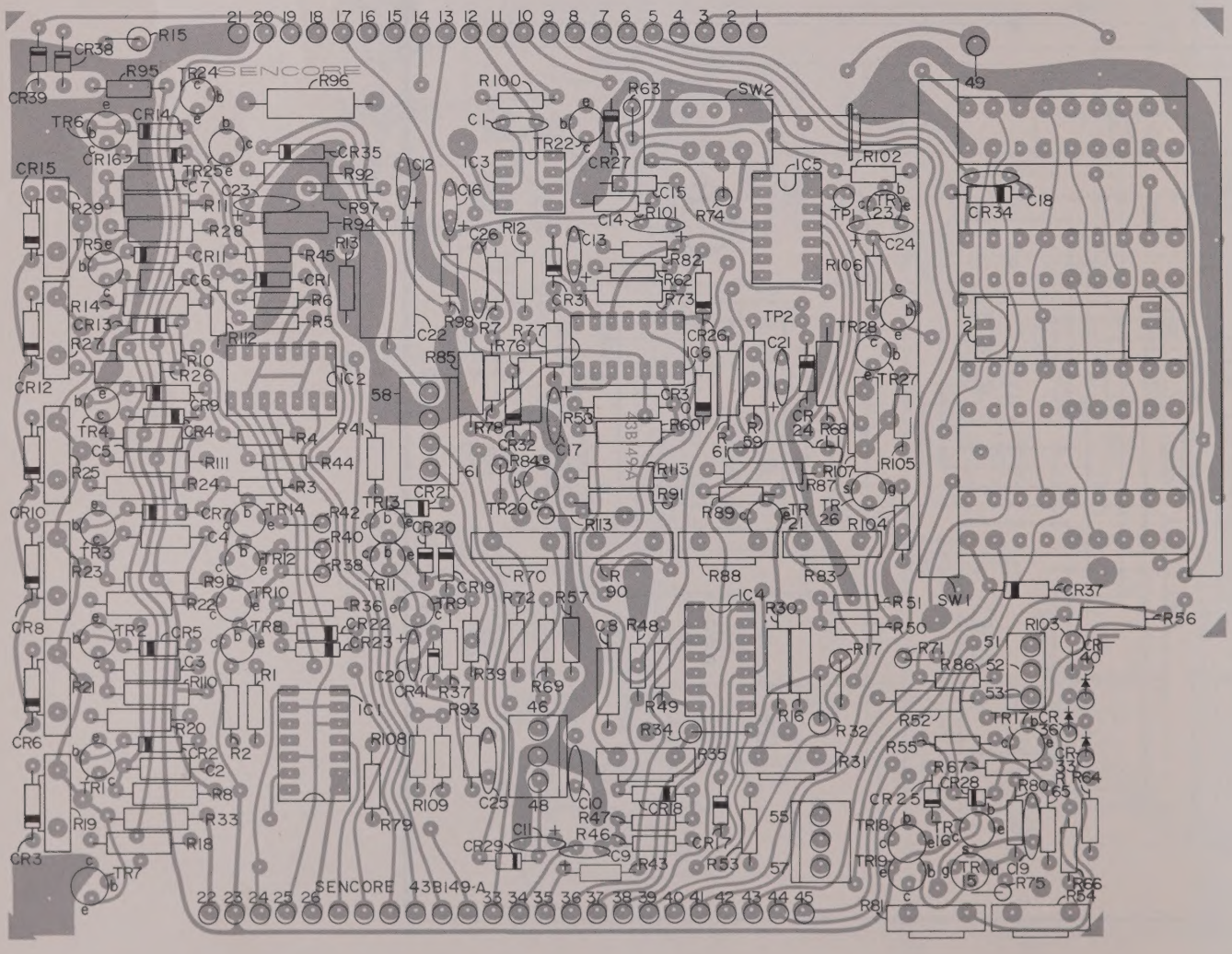
SCHEMATIC REFERENCE	PART NO.	DESCRIPTION
ANALOG P.C. BOARD (1000 Board)		
IC1, 2	69G3	IC, 4011 Quad 2 in NAND
IC3	69G21	IC, CA3130 Op Amp
IC4, 6	69G13	IC, LM324 Quad Op Amp
IC5	69G46	IC, TL084 Bi FET Quad Op Amp
TR1-8, 10, 12, 14, 16, 17, 22, 24, 27, 28	19A33-1	Transistor, 2N3904 NPN
TR9, 11, 13, 18	19A34-1	Transistor, 2N3906 PNP
TR15	19A19	Transistor, MPF102 N Channel FET
TR19	19A30-1	Transistor, MJE 170 PNP
TR20, 21	19A45	Transistor, 2N5771 PNP
TR23	19A4-1SEL1	Transistor, 2N5172 NPN Graded for low leakage
TR25	19A29-1	Transistor, MJE 180 NPN
TR26	19A36	Transistor, J201 N Channel FET
CR1, 4	50C12-1	Diode, 6.2V Zener, Temp. Comp.
CR2, 3, 5-21, 26, 27, 29-34, 36-42	50C5-2	Diode, 1N4148
CR23, 35	50C4-6	Diode, 6.2V, Zener
CR24	50C3-1	Diode, 1N34A
CR25, 28	50G14	Diode, MBD 502 Hot Carrier
R16	14C29-4104A	Resistor, 41K, ½W, 1%, 100 ppm/°C
R17	14C29-3004A	Resistor, 30K, ½W, 1%, 100 ppm/°C
R18, 28	14C30-2703A	Resistor, 2.7K, ½W, 2%, 100 ppm/°C
R19, 21, 23, 25, 27, 29	15C7-31	Control, 2.5K, Vert PC Mount Pot
R20, 22, 24, 26	14C30-3003A	Resistor, 3K, ½W, 2%, 100 ppm/°C
R30	14C29-1855A	Resistor, 185K, ½W, 1%, 100 ppm/°C
R30	14C29-1855A	Resistor, 185K, ½W, 1%, 100 ppm/°C
R31, 35	15C7-13	Control, 100K, Vert PC Mount Pot
R32, 45	14C29-1005A	Resistor, 100K, ½W, 1%, 100 ppm/°C
R36	14C29-1002A	Resistor, 100 Ohm, ½W, 1%, 100 ppm/°C
R38, 40	14C29-1003A	Resistor, 1K, ½W, 1%, 100 ppm/°C
R42	14C29-4703A	Resistor, 4.7K, ½W, 1%, 100 ppm/°C
R44	14C29-3304A	Resistor, 33K, ½W, 1%, 100 ppm/°C
R54, 81	15C7-2	Control, 10K, Vert PC Mount Pot
R58-60, 68, 73, 76	14C29-1004A	Resistor, 10K, ½W, 1%, 100 ppm/°C
R61, 94	14C29-2004A	Resistor, 20K, ½W, 1%, 100 ppmL°C
R70	15C7-7	Control, 5M, Vert PC Mount Pot
R83	15C7-26	Control, 1M, Vert PC Mount Pot
R87	14C32-9006A	Resistor, 9M, 1W 1%
R88, 107	15C7-17	Control, 1K, Vert PC Mount Pot
R90	15C7-9	Control, 100 Ohm, Vert PC Mount Pot.
R91	14C29-6001A	Resistor, 60 Ohm, ½W, 1%, 100 ppm/°C
R92	14C29-2002A	Resistor, 200 Ohm, ½W, 1%, 100 ppm/°C
R99	14A52-14	Resistor, 50 Ohm, 10W
R113	14C29-9003A	Resistor, 9K, ½W, 1%, 100 ppm/°C
C1, 10	24G70	Capacitor, 100 pF disc NPO
C2,3	24G188	Capacitor, .001 uF Poly 5%
C4	24G346	Capacitor, .01 uF Mylar 10%
C5	24G195	Capacitor, .022uF Mylar
C6	24G338	Capacitor, .033 uF Mylar
C7	24G216	Capacitor, .1 uF Mylar
C8	24G374	Capacitor, .33 uF Film 10%
C9, 12-14, 16, 17, 21	24G384	Capacitor, 2 uF Lytic
C11, 20, 23, 24	24G382	Capacitor, 10 uF
C15	24G286	Capacitor, .001 uF 200V 20% Mylar
C18, 28	24G207	Capacitor, .01 uF Disc
C19	24G168	Capacitor, .22 uF Mylar
C22	24G118	Capacitor, 100 uF Lytic
C26	24G82	Capacitor, 100 pF Disc
C27	24G17	Capacitor, .001 uF Disc
SW1	25A273-C	Switch, 4 Module, 6 Pole, P.B.
SW2	25A225-A	Switch, 1 Section, 2 Pole, P.B.
L1	46G76	Coil, 3.9 uH
L2	41G7	Reed Relay

SHEET 2

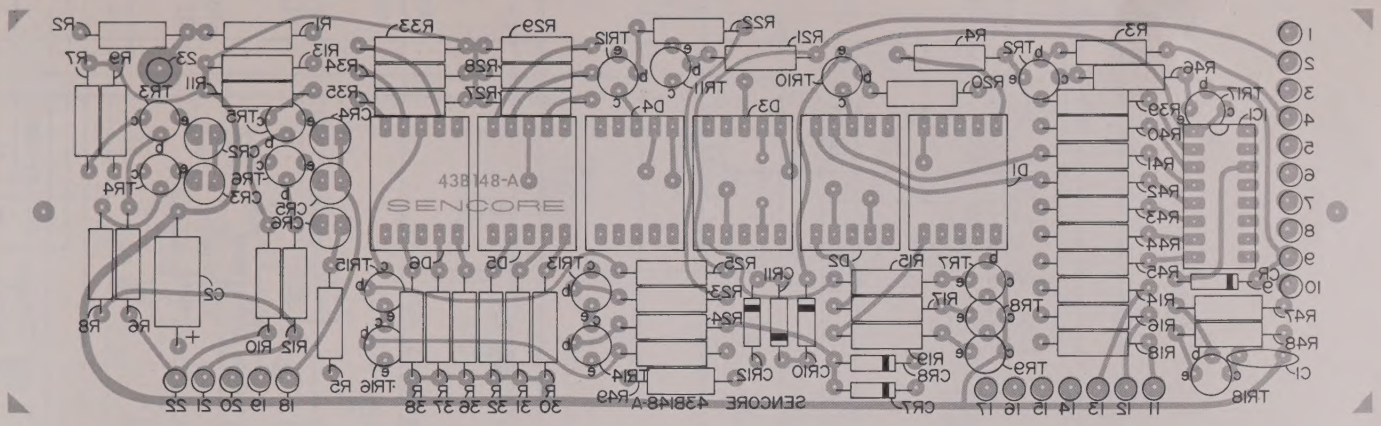
This sheet includes schematic for the Digital Board. Layouts are found on Sheet 1.



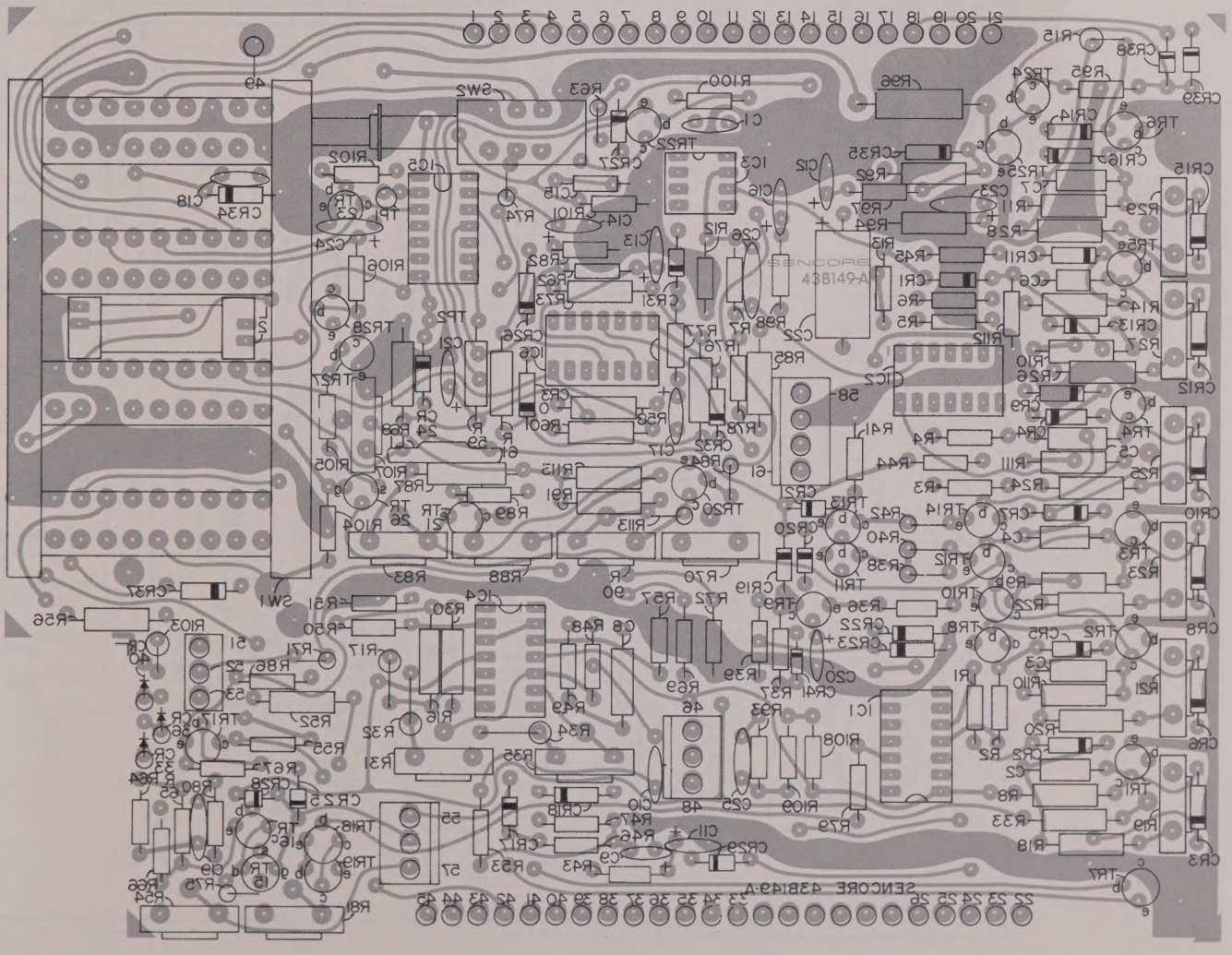
DISPLAY BOARD (COMPONENT SIDE)



ANALOG BOARD (COMPONENT SIDE)

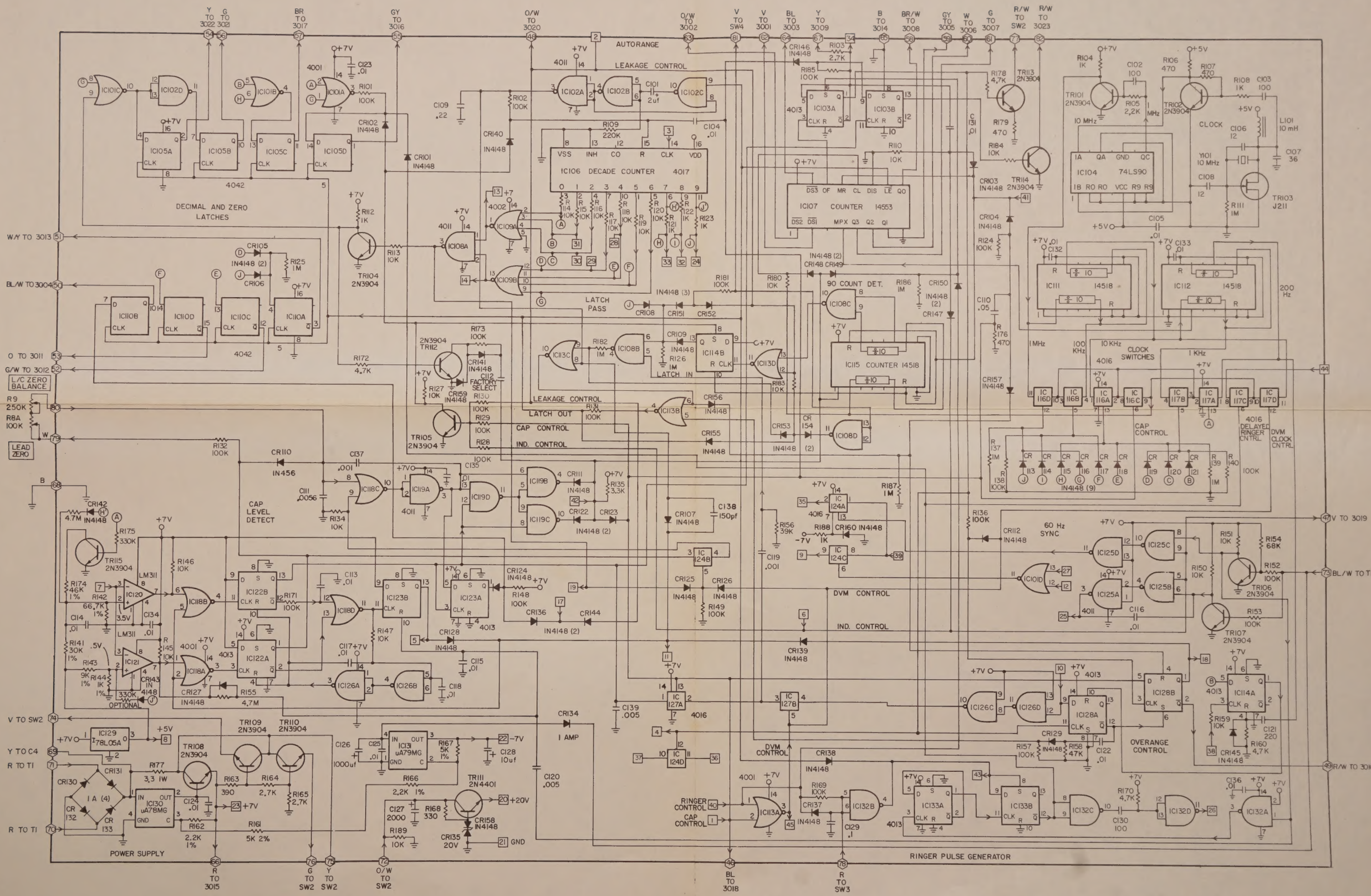


DISPLAY BOARD (FOIL SIDE)



ANALOG BOARD (FOIL SIDE)

The schematic for the Analog Board is found on Sheet 1.


Y TO 3022
G TO 3021
BR TO 3017
GY TO 3016
O/W TO 3020
O/W TO 3002
V TO SW4
V TO 3001
BL TO 3003
Y TO 3009
B TO 3014
BR/W TO 3008
GY TO 3005
W TO 3006
G TO 3007
R/W TO SW2
R/W TO 3023
AUTORANGE
LEAKAGE CONTROL
IC106 DECADE COUNTER 4017
IC107 COUNTER 14553
IC105A
IC105B
IC105C
IC105D
4042
DECIMAL AND ZERO LATCHES
IC101A
IC101B
IC101C
IC101D
IC102A
IC102B
IC102C
IC103A
IC103B
IC104 74LS90
IC108A
IC108B
IC108C
IC108D
IC109A
IC109B
IC110A
IC110B
IC110C
IC110D
IC111 14518
IC112 14518
IC113A
IC113B
IC113C
IC113D
IC114A
IC114B
IC115 COUNTER 14518
IC116A
IC116B
IC116C
IC116D
IC117A
IC117B
IC117C
IC117D
IC118A
IC118B
IC118C
IC118D
IC119A
IC119B
IC119C
IC119D
IC120
IC121
IC122A
IC122B
IC123A
IC123B
IC124A
IC124B
IC124C
IC124D
IC125A
IC125B
IC125C
IC125D
IC126A
IC126B
IC126C
IC126D
IC127A
IC127B
IC128A
IC128B
IC129 78L05A
IC130 uA78MG
IC131 uA79MG
IC132A
IC132B
IC132C
IC132D
IC133A
IC133B
4016 DELAYED RINGER CNTRL
DVM CLOCK CNTRL
CLOCK
CLOCK SWITCHES
CAP CONTROL
DVM CONTROL
IND. CONTROL
LATCH PASS
LATCH IN
LATCH OUT
CAP CONTROL
IND. CONTROL
90 COUNT DET.
OVERANGE CONTROL
60 Hz SYNC
RINGER PULSE GENERATOR
POWER SUPPLY
CAP LEVEL DETECT
FACTORY SELECT
L/C ZERO BALANCE
LEAD ZERO
OPTIONAL
1 AMP
W/Y TO 3013
BL/W TO 3004
O TO 3011
G/W TO 3012
V TO SW2
Y TO C4
R TO TI
R TO TI
R TO 3015
G TO SW2
Y TO SW2
O/W TO SW2
BL TO 3018
R TO SW3
47V TO 3019
BL/W TO TI
R/W TO 3010
+7V
+5V
-7V
+20V
GND
10 MHz
1 MHz
100 KHz
10 KHz
1 KHz
200 Hz
CR101 IN4148
CR102 IN4148
CR103 IN4148
CR104 IN4148
CR105 IN4148 (2)
CR106
CR107 IN4148
CR108
CR109 IN4148
CR110 IN456
CR111 IN4148
CR112 IN4148
CR113 IN4148
CR114 IN4148
CR115 20V
CR116 IN4148 (2)
CR117 IN4148 (2)
CR118 IN4148 (2)
CR119 IN4148 (2)
CR120 IN4148 (2)
CR121 IN4148 (2)
CR122 IN4148 (2)
CR123 IN4148 (2)
CR124 IN4148
CR125 IN4148
CR126 IN4148
CR127 IN4148
CR128 IN4148
CR129 IN4148
CR130
CR131
CR132
CR133
CR134 1 AMP
CR135 20V
CR136 IN4148 (2)
CR137 IN4148
CR138 IN4148
CR139 IN4148
CR140 IN4148
CR141 IN4148
CR142 IN4148
CR143 IN4148
CR144 IN4148 (2)
CR145 IN4148
CR146 IN4148
CR147 IN4148 (2)
CR148 CR149 IN4148 (2)
CR150 IN4148 (2)
CR151 IN4148 (3)
CR152 IN4148 (3)
CR153 IN4148 (2)
CR154 IN4148 (2)
CR155 IN4148
CR156 IN4148
CR157 IN4148
CR158 IN4148
CR159 IN4148
CR160 IN4148
IN4148 (9)
TR101 2N3904
TR102 2N3904
TR103 J211
TR104 2N3904
TR105 2N3904
TR106 2N3904
TR107 2N3904
TR108 2N3904
TR109 2N3904
TR110 2N3904
TR111 2N4401
TR112 2N3904
TR113 2N3904
TR114 2N3904
TR115 2N3904
Y101 10 MHz
L101 10 mH
R1 250K
R8A 100K
R9 250K
R101 100K
R102 100K
R103 2.7K
R104 1K
R105 2.2K
R106 470
R107 470
R108 1K
R109 220K
R110 10K
R111 1M
R112 1K
R113 10K
R114 10K
R115 10K
R116 10K
R117 10K
R118 10K
R119 10K
R120 10K
R121 1K
R122 1K
R123 1K
R124 100K
R125 1M
R126 1M
R127 10K
R128 100K
R129 100K
R130 100K
R131 100K
R132 100K
R133 100K
R134 10K
R135 3.3K
R136 100K
R137 1M
R138 100K
R139 1M
R140 100K
R141 30K 1%
R142 66.7K 1%
R143 9K 1%
R144 1K 1%
R145 10K
R146 10K
R147 10K
R148 100K
R149 100K
R150 10K
R151 10K
R152 100K
R153 100K
R154 68K
R155 4.7M
R156 39K
R157 100K
R158 47K
R159 10K
R160 4.7K
R161 5K 2%
R162 2.2K 1%
R163 390
R164 2.7K
R165 2.7K
R166 2.2K 1%
R167 5K 1%
R168 330
R169 100K
R170 4.7K
R171 100K
R172 4.7K
R173 100K
R174 46K 1%
R175 330K
R176 470
R177 3.3 1W
R178 4.7K
R179 470
R180 10K
R181 100K
R182 1M
R183 10K
R184 10K
R185 100K
R186 1M
R187 1M
R188 1K
R189 10K
C101 2uf
C102 100
C103 100
C104 .01
C105 .01
C106 12
C107 36
C108 12
C109 .22
C110 .05
C111 .0056
C112 .01
C113 .01
C114 .01
C115 .01
C116 .01
C117 .01
C118 .01
C119 .001
C120 .005
C121 220
C122 .01
C123 .01
C124 .01
C125 .01
C126 1000uf
C127 2000
C128 10uf
C129 .1
C130 100
C131 .01
C132 .01
C133 .01
C134 .01
C135 .01
C136 .01
C137 .001
C138 150pf
C139 .005
LM311
LM311
LM311
4001
4002
4011
4013
4016
TRIM 4
TRIM 10
TRIM 14
TRIM 16
TRIM 20
TRIM 24
TRIM 28
TRIM 32
TRIM 36
TRIM 40
TRIM 44
TRIM 48
TRIM 52
TRIM 56
TRIM 60
TRIM 64
TRIM 68
TRIM 72
TRIM 76
TRIM 80
TRIM 84
TRIM 88
TRIM 92
TRIM

SCHEMATIC REFERENCE	PART NO.	DESCRIPTION
DISPLAY P.C. BOARD (3000 Board)		
IC1	69G35	IC, BCD - 7 Seg. Decoder/Driver 7447
TR2-9	19A34-1	Transistor, 2N3906, PNP
TR17, 18	19A33-1	Transistor, 2N3904 NPN
TR10-16	19A40	Transistor, 2N4403 PNP
CR2-6	20G14	LED Indicator
CR7-9	50C5-2	Diode, 1N4148
CR10-12	16S10	Diode, 1 Amp
C1	24G207	Capacitor, .01 Disc
C2	24G121	Capacitor, 20 uF 15V Lytic
D1-6	23G63	7 Segment Display T1L321
CHASSIS MOUNTED PARTS		
CR1, 2	16S5-SEL1	Diode, 1A, 800V PIV
CR3, 5	16S10	Diode, 1A
CR4	20G14	LED Indicator
R1	14B49-30	Resistor, 68 Ohms, 5W
R3	14B49-31	Resistor, 2K, 5W
R4	14B49-22	Resistor, 5K, 5W
R7	15C3-15	Control, 5K, Tab Mtg, Pot
R8	15B21-D	Control, 100K, Dual Pot, Lead Zero
R9	15C3-4	Control, 250K, Tab Mtg, Zero Balance, Pot
C1	24G9	Capacitor, .005 uF Disc
C4	24G240	Capacitor, 2000 uF 25V Lytic
C5	24G341	Capacitor, 2700 pF, Poly, 5%
C6, 10	24G279	Capacitor, 470 pF, Poly, 5%
C7	24G345	Capacitor, .0022 uF, Poly, 10%
C8	24G403	Capacitor, .01 uF, Poly, 10%, 400V
C9	24G404	Capacitor, .033 uF, Poly, 10%, 200V
SW1	25G294	Switch, Rocker, 1PIT, Off, On
SW2	25A275-C	Switch, Leakage
SW3	25A274	Switch, Ringing
SW4	25G245	Switch, Rocker, 2P2T, Leakage Range
T1	28K76-D	Power Transformer
	110K431	Case, Riveted Ass'y.
	110C433-D	VAC Formed Case Back Riveted Ass'y
	21A37	Knob Rotary
	21A58	Push Button
	21K80	Knob, Zero Adjust
	39G143	Test Lead Ass'y
	39G144	Test Lead Adapter
	22B70	Handle, Molded
	39G154	Button Hold Accessory
	63K25-B	Filter, Red Display
	8C239	Bezel, Molded

Components not listed are standard replacement parts and may be purchased locally. When ordering parts, please specify instrument model number, schematic reference, part number, and description. Please include remittance (check or money order) with your order, otherwise invoice will be shipped C.O.D. Minimum billing is $5.00

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